SAMPLING QA/QC WORK PLAN

SECOND STREET SITE
PERTH AMBOY, MIDDLESEX COUNTY, NEW JERSEY

Prepared by

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Prepared for

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DCN #: START-02-F-00475
TDD #: 02-96-07-0008
EPA Contract No.: 68-W5-0019

Approved by:

START

Subbarao Bhamidipati
Project Manager

Date: Aug 23, 96

START

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Date: 8/28/96

EPA

Chaitanya Agnihotri
On-Scene Coordinator

Date:

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1.0 BACKGROUND

The Second Street Site is located at the southern end of Second Street, Perth Amboy, Middlesex County, New Jersey (Attachment A, Figure 1). The site is a beach and bulkhead area in a tidal zone approximately 300 feet long, 20 feet wide and, extending as much as 60 feet into the tidal zone of the Raritan River Bay. The New Jersey Rail Road runs approximately 60 feet east of the western boundary of the site. The property on the north abutting the bulkhead belongs to Goldberg and Sons, a scrap metal reclamation yard.

According to a previous Technical Assistance Team (TAT) site investigation report, a fence existed about 10 feet north of the bulkhead in 1994. The area between the bulkhead and the fence received fill, ranging from cement blocks and columns to scrap metal such as drums, wire rope, and compressed gas cylinders. During a sweep of the area by personnel involved in the Raritan Arsenal cleanup project, numerous gas cylinders were discovered beyond the bulkhead in the tidal zone.

A site reconnaissance was performed on 5 August, 1996 by personnel from the Superfund Technical Assessment and Response Team (START), the U.S. EPA and the Emergency Response Cleanup Services (ERCS) contract. The reconnaissance was undertaken to demarcate probable sampling points. The crew did not observe the fence which was reported to exist on the Goldberg property. During the site reconnaissance, the team members observed a 55-gallon drum lying in the tidal waters near the western boundary of the site. The drum appeared to be intact and bulged. A gas cylinder was observed underneath the New Jersey Rail Road bridge lying in the water. A small canister was found within the rocky area of the site. The rocky area is located in the southeastern part of the site and is comprised of small boulders. The OSC informed START that the area between the bulkhead and the old fence, which used to exist at the site, is part of the Goldberg property and would not be considered as a portion of the site. The site is completely accessible. Trespassing is evident, as footprints were observed throughout the beach area. A person fishing about 100 feet east of the property was observed during the site reconnaissance.

The present scope of work includes collecting soil samples from the areas of potential contamination for heavy metals and organics analyses. A complete scan of Target Compound List (TCL) and Target Analyte List, including cyanide (TAL+CN) parameters will be performed on these samples.

2.0 DATA USE OBJECTIVES

The objective of this sampling event is to identify areas of contamination and to assist with the determination of CERCLA Removal Action eligibility. The analytical results will also be used to evaluate migration pathways and potential threats to public health and safety.

3.0 QUALITY ASSURANCE OBJECTIVES

The overall Quality Assurance (QA) objective for chemical measurement data associated with this sampling event is to provide analytical results that are legally defensible in a court of law. The QA program will incorporate Quality Control (QC) procedures for field sampling, chain of custody, laboratory analyses, and reporting to assure generation of sound analytical results.

The EPA OSC has specified a Level 2 QA objective (QA-2). Details of this QA level are provided in Section 6.0.

The objective of this project/event applies to the following parameters:

Table 1
Quality Assurance Objectives

QA Parameters	Matrix	Intended Use of Data	QA Objective
Target Compound List (TCL) Volatiles	Soil	Removal Action Eligibility	QA-2
TCL Semivolatiles	Soil	Removal Action Eligibility	QA-2
TCL PCBs	Soil	Removal Action Eligibility	QA-2
Target Analyte List (TAL) Metals + CN	Soil	Removal Action Eligibility	QA-2

A Field Sampling Summary is presented in Table 2 and a QA/QC Analysis and Objectives Summary is presented in Table 3, Section 4.4 . The TCL Quantitation Limits and TAL Detection Limits are presented in Attachment B. Section 4.2, Sampling Design, provides information on analyses to be performed on the individual soil and sediment sample groups.

TABLE 2: FIELD SAMPLING SUMMARY

Analytical Parameters	Matrix	Container Size	Preservative	Holding Time	Subtotal Samples	Rinsate Blanks†	Duplicate Samples	MS/MSD Samples	Field Samples
TCL Volatiles	Soil	2 120-ml wide-mouth glass jars	Cool to 4° C	10 days*	5	1**	1	1	7
TCL Semivolatiles	Soil	8-oz. glass jar	Cool to 4° C	10 days*	5		1	1	7
TAL Metals+CN	Soil	8-oz. glass jar	Cool to 4° C	180 days to analyze (except Hg - 28 days)	5		1	1	7

** An additional rinsate blank will be collected, if the stainless steel scoops fail to penetrate the ground and an augur needs to be utilized.

* Holding time is determined from the date of collection to extraction and/or analysis. Extracts for organic fraction analyses must be analyzed within 40 days of the date of extraction.

† One composite rinsate sample will be taken for the day. Rinsate blank sample volumes and container sizes are as follows: Total metals (1 1-L poly), TCL Volatiles (2 40-ml glass vials), TCL Semivolatiles and TCL PCBs (4 1-L amber bottles).

4.0 APPROACH AND SAMPLING METHODOLOGIES

4.1 Sampling Equipment

Surface and subsurface soil samples to be submitted for TAL metals and cyanide analyses will be collected with non-dedicated, stainless steel trowels. Subsurface soil samples for TCL analyses will be collected with a non-dedicated, stainless steel bucket auger and homogenized in a non-dedicated, stainless steel bowl. The TCL volatile organic fraction of each sample will be collected prior to homogenization.

To avoid cross-contamination, each stainless steel auger, trowel and bowl will be decontaminated after each discreet sample is acquired. EPA/ERT SOP #2006, Sampling Equipment Decontamination (Attachment C), will be used. The individual steps of equipment decontamination are listed below:

Decontamination Steps

1. Physical removal of gross contamination,
2. Low-phosphate detergent wash,
3. Potable water rinse,
4. 10% nitric acid rinse (ultra-pure grade),
5. Potable water rinse,
6. Acetone rinse *or* methanol, then hexane (pesticide-grade or better) rinse,
7. Thorough final rinse with demonstrated analyte-free deionized water (volume used must be 3-5 times the volume of solvent used in the previous step), and
8. Air dry; wrap in aluminum foil until next use.

If samples are not being collected for determination of inorganic analytes, the 10% nitric acid rinse may be omitted. Conversely, if the samples are not being collected for determination of organic constituents, the solvent rinse may be omitted. The tap water may be obtained from any municipal water treatment system.

One rinsate blank sample will be collected during this sampling event. This rinsate blank sample will be a composite rinsate of the decontaminated sampling equipment (e.g., trowel, bowl). If the OSC requests the collection of subsurface samples, or if the stainless steel scoops fail to penetrate the ground, an additional sample will be collected for auger rinsate. The rinsate blank is an indicator of the effectiveness of equipment decontamination. Only demonstrated distilled, deionized blank water will be used in the collection of rinsate blanks.

4.2 Sampling Design

A maximum of 5 surface/subsurface soil samples will be collected with non-dedicated stainless steel scoops and analyzed for full TCL and TAL+CN analysis. Prior to the sample collection gravel, debris, or foliage will be removed from the sampling point. Samples will be collected from 0-9 inches in depth. All sample locations will be biased and be determined by the OSC based on previous studies conducted on the site and visual observation. Since the sampling locations are on the shore of the Raritan River, START expects to collect all the samples using non-dedicated stainless steel scoops. However, if the sand cannot be penetrated with the stainless steel scoops, samples will be obtained using non-dedicated, stainless steel bucket augers. At the desired sampling depth, the auger contents will be emptied into a non-dedicated, stainless steel bowl and homogenized prior to transfer into the sample container. The volatile organic fraction of the sample will be collected prior to homogenization.

QA/QC samples will include the collection of one field duplicate and one matrix spike/matrix spike duplicate (MS/MSD) sample. Extra sample volume will be submitted to allow the laboratory to perform matrix spike sample analysis. This analysis provides information about the effect of sample matrix on digestion/extraction and measurement methodologies. Field duplicate samples provide an indication of analytical variability and analytical error and will not be identified to the laboratory. In addition, one composite rinsate (trowel+bowl) blank will be submitted to meet QA/QC requirements. (If the OSC requests the collection of subsurface samples, or if the stainless steel scoops fail to penetrate the ground, an additional sample will be collected for auger rinsate). The rinsate blank is an indicator of the effectiveness of equipment decontamination.

This sampling design is based on information currently available and may be modified on site in light of field screening results and other acquired information. All deviations from the sampling plan will be noted in the Sampling Trip Report.

4.3 Standard Operating Procedures (SOPs)

4.3.1 Sample Documentation

All sample documents will be completed legibly, in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error.

FIELD LOGBOOK

The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. All entries will be dated and signed by the individuals making the entries, and should include (at a minimum) the following:

1. Site name and project number.
2. Name(s) of personnel on site.
3. Dates and times of all entries (military time preferred).
4. Descriptions of all site activities, site entry and exit times.

5. Noteworthy events and discussions.
6. Weather conditions.
7. Site observations.
8. Sample and sample location identification and description*.
9. Subcontractor information and names of on-site personnel.
10. Date and time of sample collections, along with chain of custody information.
11. Record of photographs.
12. Site sketches.

* The description of the sample location will be noted in such a manner as to allow the reader to reproduce the location in the field at a later date.

SAMPLE LABELS

Sample labels will clearly identify the particular sample, and should include the following:

1. Site/project number;
2. Sample identification number;
3. Sample collection date and time;
4. Designation of sample (grab or composite);
5. Sample preservation;
6. Analytical parameters; and
7. Name of sampler.

Sample labels will be written in indelible ink and securely affixed to the sample container. Tie-on labels can be used if properly secured.

CHAIN OF CUSTODY RECORD

A chain of custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples (or groups of samples) are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. Specific information regarding custody of the samples projected to be collected on the weekend will be noted in the field logbook.

The chain of custody record should include (at minimum) the following:

1. Sample identification number.
2. Sample information.
3. Sample location.
4. Sample date.
5. Name(s) and signature(s) of sampler(s).
6. Signature(s) of any individual(s) with control over samples.

CUSTODY SEALS

Custody seals demonstrate that a sample container has not been tampered with, or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook.

4.3.2 Sampling SOPs

SOIL SAMPLING

Soil sampling activities will be conducted in accordance with guidelines outlined in EPA/ERT Soil Sampling SOP #2012 (Attachment D).

4.3.3 Sample Handling and Shipment

Only certified clean sample containers (jars, bottles, etc.) will be used for the sampling event. Each of the sample bottles will be sealed and labeled according to the following protocol. Caps will be secured with custody seals. Bottle labels will contain all required information including site/project code and sample number, time and date of collection, analyses requested, and preservative used. Sealed bottles will be placed in large metal or plastic coolers, and padded with an absorbent material such as vermiculite. All packaging will conform to IATA Transportation regulations for overnight carriers.

All sample documents will be affixed to the underside of each cooler lid. The lid will be sealed and affixed on at least two sides with custody seals so that any sign of tampering is easily visible.

4.4 Analytical Methods

Analytical methods to be utilized in the analyses of samples collected during this sampling event are detailed in Table 3:

TABLE 3
QA/QC Analysis and Objectives Summary

Analytical Parameters	Matrix	Analytical Method Reference	QA/QC Quantitation Limits	QA Objective
TCL Volatiles	Soil	CLP SOW OLMO3.0 or most current revision	See Attachment C	QA-2
TCL Semivolatiles	Soil	CLP SOW OLMO3.0 or most current revision	See Attachment C	QA-2
TAL Metals+CN	Soil	CLP SOW ILMO3.0 or most current revision	See Attachment C	QA-2

Note: CLP-format deliverables required for all data packages.

4.5 Schedule of Activities

Proposed Start Date	Activity	End Date
August 26, 1996	Soil Sampling	August 26, 1996*

* depending on climatic conditions

5.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The EPA OSC, Chaitanya Agnihotri, will provide overall direction to the staff concerning project sampling needs, objectives, and schedule. The START Project Manager (PM), Subbarao Bhamidipati, will be the primary point of contact with the OSC. The PM is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks, including reporting and deliverables. The Site QC Coordinator will be responsible for ensuring field adherence to the Sampling QA/QC Plan and recording of any deviations. The START Analytical Services Coordinator, Smita Sumbaly, will be the primary project team site contact with the subcontracted laboratory, if necessary.

The START will arrange for the laboratory analyses. START personnel will transfer custody of the soil samples for shipment to the appropriate laboratory. The raw analytical data from the laboratory will be provided to the START Analytical Services Group for data validation.

The following sampling personnel will work on this project:

Personnel	Responsibility
Raymond Klimcsak	Sampling Coordinator

The following laboratories will provide the following analyses:

Lab Name/Location	Sample Type	Parameters
To be determined	Soil (grab)	TCL Volatiles TCL Semivolatiles TAL Metals+CN

A standard turnaround time of 3 weeks for written and 2 weeks for verbal results will be requested.

6.0 QA REQUIREMENTS

The following requirements apply to the respective QA Objectives and parameters identified in Section 3.0. The QA Protocols for a Level 2 QA objective sampling event are applicable to all sample matrices and include:

1. Sample documentation in the form of field logbooks, appropriate field data sheets, and chain of custody records (chain of custody records are optional for field screening locations);

2. Calibration of all monitoring and/or field-portable analytical equipment prior to collection and analyses of samples with results and/or performance check procedures/methods summarized and documented in a field, personal, and/or instrument log notebook;

3. Field or laboratory determined method detection limits (MDLs) will be recorded along with corresponding analytical sample results, where appropriate;

4. Analytical holding times as determined from the time of sample collection through analysis. These will be documented in the field logbook or by the laboratory in the final data deliverable package;

5. Initial and continuous instrument calibration data;

6. QC blank results (rinsate, method, preparation, instrument, etc.), as applicable;

7. Collection and analysis of blind field duplicate and MS/MSD QC samples to provide a quantitative measure of the analytical precision and accuracy, as applicable; and

8. Use of the following QC procedure for QC analyses and data validation:

   - Definitive identification - confirm the identification of analytes on 10% of the screened (field or laboratory) or 100% of the unscreened samples, via an EPA-approved method; provide documentation such as gas chromatograms, mass spectra, etc.

7.0 DELIVERABLES

The START PM, Subbarao Bhamidipati, will maintain contact with the EPA OSC, Chaitanya Agnihotri, to keep him informed about the technical and financial progress of this project. This communication will commence with the issuance of the work assignment and project scoping meeting. Activities under this project will be reported in status and trip reports and other deliverables (e.g., analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

<u>TRIP REPORT</u>

A trip report will be prepared to provide a detailed accounting of what occurred during each sampling mobilization. The trip report will be prepared within 1 week of the last day of each sampling mobilization. Information will be provided on time of major events, dates, and personnel on site (including affiliations).

MAPS/FIGURES

Maps depicting site layout, contaminant source areas, and sample locations will be included in the trip report, as appropriate.

ANALYTICAL REPORT

An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

DATA REVIEW

A review of the data generated under this plan will be undertaken. The assessment of data acceptability or useability will be provided separately, or as part of the analytical report.

8.0 DATA VALIDATION

Data generated under this QA/QC Sampling Plan will be evaluated according to criteria contained in the Removal Program Data Validation Procedures that accompany OSWER Directive number 9360.4-1.

Laboratory analytical results will be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

9.0 SYSTEM AUDIT

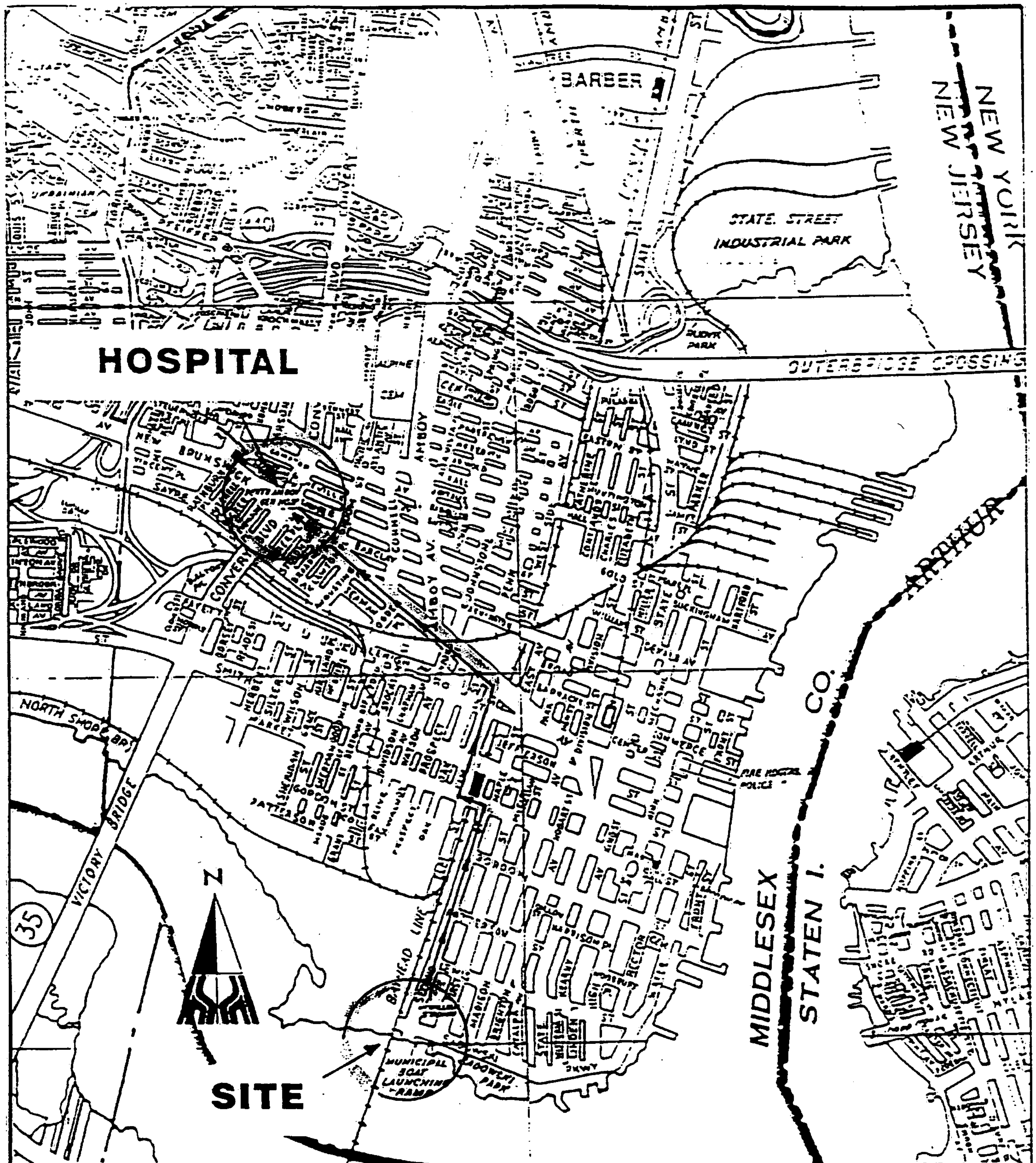
The Field QA/QC Officer will observe sampling operations and review subsequent analytical results to ensure compliance with the QA/QC requirements of the project/sampling event.

10.0 CORRECTIVE ACTION

All provisions will be taken in the field and laboratory to ensure that any problems that may develop will be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Any deviations from this sampling plan will be noted in the final report.

ATTACHMENT A

SITE MAPS



WESTON MANAGERS DESIGNERS/CONSULTANTS — Roy F. Weston, Inc. FEDERAL PROGRAMS DIVISION	EPA OSC C. Agnihotri	Hospital Route
IN ASSOCIATION WITH FOSTER WHEELER USA CORPORATION, C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC., R.E. SARRIERA ASSOCIATES, AND GRB ENVIRONMENTAL SERVICES, INC.	START PM S. Bhamidipati	Second Street

ATTACHMENT B

ANALYTICAL DETECTION LIMITS

TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Volatiles	CAS Number	Quantitation Limits [2] Water ug/L	Soil/Sediment [3] ug/Kg
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
3.	Vinyl Chloride	75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene Chloride	75-09-2	10	10
6.	Acetone	67-64-1	10	10
7.	Carbon Disulfide	75-15-0	10	10
8.	1,1-Dichloroethene	75-35-4	10	10
9.	1,1-Dichloroethane	75-34-3	10	10
10.	1,2-Dichloroethene (total)	540-59-0	10	10
11.	Chloroform	67-66-3	10	10
12.	1,2-Dichloroethane	107-06-2	10	10
13.	2-Butanone	78-93-3	10	10
14.	1,1,1-Trichloroethane	71-55-6	10	10
15.	Carbon Tetrachloride	56-23-5	10	10
16.	Bromodichloromethane	75-27-4	10	10
17.	1,2-Dichloropropane	78-87-5	10	10
18.	cis-1,3-Dichloropropene	10061-01-5	10	10
19.	Trichloroethene	79-01-6	10	10
20.	Dibromochloromethane	124-48-1	10	10

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment QL.

Based on the Contract Laboratory Program Statement of Work, OLMO1.8 (8/91).

TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Volatiles	CAS Number	Quantitation Limits [2] Water ug/L	Soil/ Sediment[3] ug/Kg
21.	1,1,2-Trichloroethane	79-00-5	10	10
22.	Benzene	71-43-2	10	10
23.	trans-1,3-Dichloropropene	10061-02	10	10
24.	Bromoform	75-25-2	10	10
25.	4-Methyl-2-pentanone	108-10-1	10	10
26.	2-Hexanone	591-78-6	10	10
27.	Tetrachloroethene	127-18-4	10	10
28.	Toluene	108-88-3	10	10
29.	1,1,2,2-Tetra-chloroethane	79-34-5	10	10
30.	Chlorobenzene	108-90-7	10	10
31.	Ethyl Benzene	100-41-4	10	10
32.	Styrene	100-42-5	10	10
33.	Xylenes (total)	1330-20-7	10	10

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	Compounds	CAS Number	Quantitation Limits [2] Water ug/L	Soil/Sediment [3] ug/Kg
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
3.	Vinyl Chloride	75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene Chloride	75-09-2	10	10
6.	Acetone	67-64-1	10	10
7.	Carbon Disulfide	75-15-0	10	10
8.	1,1-Dichloroethene	75-35-4	10	10
9.	1,1-Dichloroethane	75-34-3	10	10
10.	1,2-Dichloroethene (total)	540-59-0	10	10
11.	Chloroform	67-66-3	10	10
12.	1,2-Dichloroethane	107-06-2	10	10
13.	2-Butanone	78-93-3	10	10
14.	1,1,1-Trichloroethane	71-55-6	10	10
15.	Carbon Tetrachloride	56-23-5	10	10
16.	Bromodichloromethane	75-27-4	10	10
17.	1,2-Dichloropropane	78-87-5	10	10
18.	cis-1,3-Dichloropropene	10061-01-5	10	10
19.	Trichloroethene	79-01-6	10	10
20.	Dibromochloromethane	124-48-1	10	10
21.	1,1,2-Trichloroethane	79-00-5	10	10
22.	Benzene	71-43-2	10	10
23.	trans-1,3-Dichloropropene	10061-02-6	10	10
24.	Bromoform	75-25-2	10	10
25.	4-Methyl-2-pentanone	108-10-1	10	10
26.	2-Hexanone	591-78-6	10	10

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TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Compounds	CAS Number	Quantitation Limits [2] Water ug/L	Soil/ Sediment [3] ug/Kg
27.	Tetrachloroethene	127-18-4	10	10
28.	Toluene	108-88-3	10	10
29.	1,1,2,2-Tetrachloroethane	79-34-5	10	10
30.	Chlorobenzene	108-90-7	10	10
31.	Ethyl Benzene	100-41-4	10	10
32.	Styrene	100-42-5	10	10
33.	Xylenes (total)	1330-20-7	10	10
34.	Phenol	108-95-2	10	330
35.	bis (2-Chloroethyl)ether	111-44-4	10	330
36.	2-Chlorophenol	95-57-8	10	330
37.	1,3-Dichlorobenzene	541-73-1	10	330
38.	1,4-Dichlorobenzene	106-46-7	10	330
39.	1,2-Dichlorobenzene	95-50-1	10	330
40.	2-Methylphenol	95-48-7	10	330
41.	2,2-oxybis (1-chloropropane)	108-60-1	10	330
42.	4-Methylphenol	106-44-5	10	330
43.	N-Nitroso-di-n-propylamine	621-64-7	10	330
44.	Hexachloroethane	67-72-1	10	330
45.	Nitrobenzene	98-95-3	10	330
46.	Isophorone	78-59-1	10	330
47.	2-Nitrophenol	88-75-5	10	330
48.	2,4-Dimethylphenol	105-67-9	10	330
49.	bis (2-Chloroethoxy)methane	111-91-1	10	330
50.	2,4-Dichlorophenol	120-83-2	10	330
51.	1,2,4-Trichlorobenzene	120-82-1	10	330
52.	Naphthalene	91-20-3	10	330
53.	4-Chloroaniline	106-47-8	10	330
54.	Hexachlorobutadiene	87-68-3	10	330
55.	4-Chloro-3-methylphenol	59-50-7	10	330
56.	2-Methylnaphthalene	91-57-6	10	330
57.	Hexachlorocyclopentadiene	77-47-4	10	330

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

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TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Compounds	CAS Number	Quantitation Limits [2] Water ug/L	Soil/ Sediment[3] ug/Kg
58.	2,4,6-Trichlorophenol	88-06-2	10	330
59.	2,4,5-Trichlorophenol	95-95-4	25	800
60.	2-Chloronaphthalene	91-58-7	10	330
61.	2-Nitroaniline	88-74-4	25	800
62.	Dimethylphthalate	131-11-3	10	330
63.	Acenaphthylene	208-96-8	10	330
64.	2,6-Dinitrotoluene	606-20-2	10	330
65.	3-Nitroaniline	99-09-2	25	800
66.	Acenaphthene	83-32-9	10	330
67.	2,4-Dinitrophenol	51-28-5	25	800
68.	4-Nitrophenol	100-02-7	25	800
69.	Dibenzofuran	132-64-9	10	330
70.	2,4-Dinitrotoluene	121-14-2	10	330
71.	Diethylphthalate	84-66-2	10	330
72.	4-Chlorophenyl-phenylether	7005-72-3	10	330
73.	Fluorene	86-73-7	10	330
74.	4-Nitroaniline	100-01-6	25	800
75.	4,6-Dinitro-2-methylphenol	534-52-1	25	800
76.	N-nitrosodiphenylamine	86-30-6	10	330
77.	4-Bromophenyl-phenylether	101-55-3	10	330
78.	Hexachlorobenzene	118-74-1	10	330
79.	Pentachlorophenol	87-86-5	25	800
80.	Phenanthrene	85-01-8	10	330
81.	Anthracene	120-12-7	10	330
82.	Carbazole	86-74-8	10	330
83.	Di-n-butylphthalate	84-74-2	10	330
84.	Fluoranthene	206-44-0	10	330

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Semivolatile TCL Compounds are 60 times the individual Low Soil/Sediment QL.

Based on Contract Laboratory Program Statement of Work, OLMO1.8 (8/91).

TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Compounds	CAS Number	Quantitation Limits [2] Water ug/L	Soil/ Sediment [3] ug/Kg
85.	Pyrene	129-00-0	10	330
86.	Butylbenzylphthalate	85-68-7	10	330
87.	3,3-Dichlorobenzidine	91-94-1	20	660
88.	Benzo(a)anthracene	56-55-3	10	330
89.	Chrysene	218-01-9	10	330
90.	bis(2-Ethylhexyl)phthalate	117-81-7	10	330
91.	Di-n-octylphthalate	117-84-0	10	330
92.	Benzo(b)fluoranthene	205-99-2	10	330
93.	Benzo(k)fluoranthene	207-08-9	10	330
94.	Benzo(a)pyrene	50-32-8	10	
95.	Indeno(1,2,3-cd)pyrene	193-39-5	10	330
96.	Dibenz(a,h)anthracene	53-70-3	10	
97.	Benzo(g,h,i)perylene	191-24-2	10	330
98.	alpha-BHC	319-84-6	0.05	1.7
99.	beta-BHC	319-85-7	0.05	1.7
100.	delta-BHC	319-86-8	0.05	1.7
101.	gamma-BHC (Lindane)	58-89-9	0.05	1.7
102.	Heptachlor	76-44-8	0.05	1.7
103.	Aldrin	309-00-2	0.05	1.7
104.	Heptachlor epoxide	1024-57-3	0.05	1.7
105.	Endosulfan I	959-98-8	0.05	1.7
106.	Dieldrin	60-57-1	0.10	3.3
107.	4,4'-DDE	72-55-9	0.10	3.3
108.	Endrin	72-20-8	0.10	3.3
109.	Endosulfan II	33213-65-9	0.10	3.3
110.	4,4'-DDD	72-54-8	0.10	3.3
111.	Endosulfan sulfate	1031-07-8	0.10	3.3
113.	4,4'-DDT	50-29-3	0.10	3.3
114.	Methoxychlor	72-43-5	0.50	17.0
115.	Endrin ketone	53494-70-5	0.10	3.3

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Pesticides/PCB TCL compounds are 15 times the individual Low Soil/Sediment QL.

Based on the Contract Laboratory Program Statement of Work, OLMO1.8 (8/91).

TARGET COMPOUND LIST (TCL) AND QUANTITATION LIMITS (QL) [1]

	Compounds	CAS Number	Quantitation Limits [2] Water ug/L	Soil/ Sediment [3] ug/Kg
116.	Endrin aldehyde	7421-36-3	0.10	3.3
117.	alpha-Chlordane	5103-71-9	0.5	1.7
118.	gamma-Chlordane	5103-74-2	0.5	1.7
120.	Aroclor-1016	12674-11-2	0.5	33.0
121.	Aroclor-1221	11104-28-2	0.5	33.0
122.	Aroclor-1232	11141-16-5	0.5	67.0
123.	Aroclor-1242	53469-21-9	0.5	33.0
124.	Aroclor-1248	12672-29-6	0.5	33.0
125.	Aroclor-1254	11097-69-1	1.0	33.0
126.	Aroclor-1260	11096-82-5	1.0	33.0

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Pesticides/PCB TCL compounds are 15 times the individual Low Soil/Sediment QL.

Based on the Contract Laboratory Program Statement of Work, OLMO1.8 (8/91).

INORGANIC TARGET ANALYTE LIST (TAL)

Analyte	Detection Limit (ug/L -- water (1))
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5,000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	3
Magnesium	5,000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5,000
Selenium	5
Silver	10
Sodium	5,000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

(1) Sediment detection limit 100x water (ug/kg--soil/sediment).

Based on the Contract Laboratory Program Statement of Work, ILMO3.0 (3/92).

ATTACHMENT C

SAMPLING EQUIPMENT DECONTAMINATION SOP #2006

1.0 SAMPLING EQUIPMENT DECONTAMINATION: SOP #2006

1.1 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel from permeating substances, reduces or eliminates transfer of contaminants to clean areas, prevents the mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

1.2 METHOD SUMMARY

Contaminants can be physically removed from equipment, or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and non-abrasive methods. These include the use of brushes, air and wet blasting, and high-pressure water cleaning, followed by a wash/rinse process using appropriate cleaning solutions. Use of a solvent rinse is required when organic contamination is present.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free.
- An untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal water treatment system for mixing of decontamination solutions.
- Acids and solvents utilized in the decontamination sequence pose the health and safety risks of inhalation or skin contact, and raise shipping concerns of permeation or degradation.
- The site work plan must address disposal of the spent decontamination solutions.
- Several procedures can be established to minimize contact with waste and the potential for contamination. For example:
  - Stress work practices that minimize contact with hazardous substances.
  - Use remote sampling, handling, and container-opening techniques when appropriate.
  - Cover monitoring and sampling equipment with protective material to minimize contamination.
  - Use disposable outer garments and disposable sampling equipment when appropriate.

1.5 EQUIPMENT/APPARATUS

- appropriate personal protective clothing
- non-phosphate detergent
- selected solvents
- long-handled brushes
- drop cloths/plastic sheeting
- trash container
- paper towels
- galvanized tubs or buckets
- tap water

- distilled/deionized water
- metal/plastic containers for storage and disposal of contaminated wash solutions
- pressurized sprayers for tap and deionized/distilled water
- sprayers for solvents
- trash bags
- aluminum foil
- safety glasses or splash shield
- emergency eyewash bottle

1.6 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions and solvents. In general, the following solvents are utilized for decontamination purposes:

- 10% nitric acid[1]
- acetone (pesticide grade)[2]
- hexane (pesticide grade)[2]
- methanol

[1] Only if sample is to be analyzed for trace metals.
[2] Only if sample is to be analyzed for organics.

1.7 PROCEDURES

As part of the health and safety plan, develop and set up a decontamination plan before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- the number, location, and layout of decontamination stations
- which decontamination apparatus is needed
- the appropriate decontamination methods
- methods for disposal of contaminated clothing, apparatus, and solutions

1.7.1 Decontamination Methods

All personnel, samples, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants, inactivate contaminants by disinfection or sterilization, or do both.

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and non-abrasive methods.

Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The following abrasive methods are available:

- Mechanical: Mechanical cleaning methods use brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

- Air Blasting: Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs or auger bits. The equipment used in air blast cleaning employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive strikes the surface, determines cleaning efficiency. Air blasting has several disadvantages: it is unable to control the amount of material removed, it can aerate contaminants, and it generates large amounts of waste.

- Wet Blasting: Wet blast cleaning, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. This method generates a large amount of waste.

Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off of a surface with pressure. In general, less of the equipment surface is removed using non-abrasive methods. The following non-abrasive methods are available:

- High-Pressure Water: This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) which relates to flow rates of 20 to 140 liters per minute.

- Ultra-High-Pressure Water: This system produces a pressurized water jet (from 1,000 to 4,000 atm). The ultra-high-pressure spray removes tightly-adhered surface film. The water velocity ranges from 500 m/sec (1,000 atm) to 900 m/sec (4,000 atm). Additives can enhance the method. This method is not applicable for hand-held sampling equipment.

Disinfection/Rinse Methods

- Disinfection: Disinfectants are a practical means of inactivating infectious agents.

- Sterilization: Standard sterilization methods involve heating the equipment. Sterilization is impractical for large equipment.

- Rinsing: Rinsing removes contaminants through dilution, physical attraction, and solubilization.

1.7.2 Field Sampling Equipment Cleaning Procedures

Solvent rinses are not necessarily required when organics are not a contaminant of concern and may be eliminated from the sequence specified below. Similarly, an acid rinse is not required if analysis does not include inorganics.

1. Where applicable, follow physical removal procedures specified in section 1.7.1.

2. Wash equipment with a non-phosphate detergent solution.

3. Rinse with tap water.

4. Rinse with distilled/deionized water.

5. Rinse with 10% nitric acid if the sample will be analyzed for trace organics.

6. Rinse with distilled/deionized water.

7. Use a solvent rinse (pesticide grade) if the sample will be analyzed for organics.

8. Air dry the equipment completely.

9. Rinse again with distilled/deionized water.

Selection of the solvent for use in the decontamination process is based on the contaminants present at the site. Use of a solvent is required when organic contamination is present on-site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. An acid rinse step is required if metals are present on-site. If a particular contaminant fraction is not present at the site, the nine-step decontamination procedure listed above may be modified for site specificity. The decontamination solvent used should not be among the contaminants of concern at the site.

Table 1 lists solvent rinses which may be required for elimination of particular chemicals. After each solvent rinse, the equipment should be air dried and rinsed with distilled/deionized water.

Sampling equipment that requires the use of plastic tubing should be disassembled and the tubing replaced with clean tubing, before commencement of sampling and between sampling locations.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/ QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the rinsate blank. The rinsate blank provides information on the effectiveness of the decontamination process employed in the field. When used in conjunction with field blanks and trip blanks, a rinsate blank can detect contamination during sample handling, storage and sample transportation to the laboratory.

Table 1: Recommended Solvent Rinse for Soluble Contaminants

SOLVENT	SOLUBLE CONTAMINANTS
Water	• Low-chain hydrocarbons • Inorganic compounds • Salts • Some organic acids and other polar compounds
Dilute Acids	• Basic (caustic) compounds • Amines • Hydrazines
Dilute Bases -- for example, detergent and soap	• Metals • Acidic compounds • Phenol • Thiols • Some nitro and sulfonic compounds
Organic Solvents[(1)] - for example, alcohols, ethers, ketones, aromatics, straight-chain alkanes (e.g., hexane), and common petroleum products (e.g., fuel, oil, kerosene)	• Nonpolar compounds (e.g., some organic compounds)

[(1)] - WARNING: Some organic solvents can permeate and/or degrade protective clothing.

A rinsate blank consists of a sample of analyte-free (i.e, deionized) water which is passed over and through a field decontaminated sampling device and placed in a clean sample container.

Rinsate blanks should be run for all parameters of interest at a rate of 1 per 20 for each parameter, even if samples are not shipped that day. Rinsate blanks are not required if dedicated sampling equipment is used.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures.

Decontamination can pose hazards under certain circumstances even though performed to protect health and safety. Hazardous substances may be incompatible with decontamination methods. For example, the decontamination solution or solvent may react with contaminants to produce heat, explosion, or toxic products. Decontamination methods may be incompatible with clothing or equipment: some solvents can permeate or degrade protective clothing. Also, decontamination solutions and solvents may pose a direct health hazard to workers through inhalation or skin contact, or if they combust.

The decontamination solutions and solvents must be determined to be compatible before use. Any method that permeates, degrades, or damages personal protective equipment should not be used. If decontamination methods pose a direct health hazard, measures should be taken to protect personnel or the methods should be modified to eliminate the hazard.

ATTACHMENT D

SOIL SAMPLING SOP #2012

2.0 SOIL SAMPLING: SOP #2012

2.1 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures for collecting representative soil samples. Analysis of soil samples may determine whether concentrations of specific soil pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health, welfare, or the environment.

2.2 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of soil. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, a trier, a split-spoon, or, if required, a backhoe.

2.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Refrigeration to 4°C, supplemented by a minimal holding time, is usually the best approach.

2.4 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary interferences or potential problems associated with soil sampling. These include cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

2.5 EQUIPMENT/APPARATUS

- sampling plan
- maps/plot plan
- safety equipment, as specified in the health and safety plan
- compass
- tape measure
- survey stakes or flags
- camera and film
- stainless steel, plastic, or other appropriate homogenization bucket or bowl
- 1-quart mason jars w/Teflon liners
- Ziploc plastic bags
- logbook
- labels
- chain of custody forms and seals
- field data sheets
- cooler(s)
- ice
- decontamination supplies/equipment
- canvas or plastic sheet
- spade or shovel
- spatula
- scoop
- plastic or stainless steel spoons
- trowel
- continuous flight (screw) auger
- bucket auger
- post hole auger
- extension rods
- T-handle
- sampling trier
- thin-wall tube sampler
- Vehimeyer soil sampler outfit
  - tubes
  - points
  - drive head
  - drop hammer
  - puller jack and grip
- backhoe

2.6 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in

ERT SOP #2006, Sampling Equipment Decontamination.

2.7 PROCEDURES

2.7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or preclean equipment, and ensure that it is in working order.

4. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.

6. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations will be utility-cleared by the property owner prior to soil sampling.

2.7.2 Sample Collection

Surface Soil Samples

Collect samples from near-surface soil with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth with this equipment, then a stainless steel or plastic scoop can be used to collect the sample.

This method can be used in most soil types but is limited to sampling near surface areas. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sampling team member. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel scoop, lab spoon, or plastic spoon will suffice in most other applications. Avoid the use of devices plated with chrome or other materials. Plating is particularly common with garden implements such as potting trowels.

Follow these procedures to collect surface soil samples.

1. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.

2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

Sampling at Depth with Augers and Thin-Wall Tube Samplers

This system consists of an auger, a series of extensions, a "T" handle, and a thin-wall tube sampler (Appendix A, Figure 1). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thin-wall tube sampler. The system is then lowered down the borehole, and driven into the soil at the completion depth. The system is withdrawn and the core collected from the thin-wall tube sampler.

Several types of augers are available. These include: bucket, continuous flight (screw), and posthole augers. Bucket augers are better for direct sample recovery since they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights, which are usually at 5-feet intervals. The continuous flight augers are satisfactory for use when a composite of the complete soil column is desired. Posthole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil.

Follow these procedures for collecting soil samples with the auger and a thin-wall tube sampler.

1. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first 3 to 6 inches of surface soil for an area approximately 6 inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from boring. When sampling directly from the auger, collect sample after the auger is removed from boring and proceed to Step 10.

5. Remove auger tip from drill rods and replace with a pre-cleaned thin-wall tube sampler. Install proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Care should be taken to avoid scraping the borehole sides. Avoid hammering the drill rods to facilitate coring as the vibrations may cause the boring walls to collapse.

7. Remove the tube sampler, and unscrew the drill rods.

8. Remove the cutting tip and the core from the device.

9. Discard the top of the core (approximately 1 inch), as this represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container(s). Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into the appropriate, labeled container(s) and secure the cap(s) tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.

12. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

Sampling at Depth with a Trier

The system consists of a trier, and a "T" handle. The auger is driven into the soil to be sampled and used to extract a core sample from the appropriate depth.

Follow these procedures to collect soil samples with a sampling trier.

1. Insert the trier (Appendix A, Figure 2) into the material to be sampled at a 0° to 45° angle from horizontal. This orientation minimizes the spillage of sample.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly.

Sampling at Depth with a Split Spoon (Barrel) Sampler

The procedure for split spoon sampling describes the collection and extraction of undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted.

When split tube sampling is performed to gain geologic information, all work should be performed in accordance with ASTM D 1586-67 (reapproved 1974).

Follow these procedures for collecting soil samples with a split spoon.

1. Assemble the sampler by aligning both sides of the barrel and then screwing the bit onto the bottom and the heavier head piece onto the top.

2. Place the sampler in a perpendicular position on the sample material.

3. Using a sledge hammer or well ring, if available, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.

4. Record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in diameters of 2 and 3 1/2 inches. However, in order to obtain the required sample volume, use of a larger barrel may be required.

6. Without disturbing the core, transfer it to an appropriate labeled sample container(s) and seal tightly.

Test Pit/Trench Excavation

These relatively large excavations are used to remove sections of soil, when detailed examination of soil characteristics (horizontal structure, color, etc.) are required. It is the least cost effective sampling method due to the relatively high cost of backhoe operation.

Follow these procedures for collecting soil samples from test pit/trench excavations.

1. Prior to any excavation with a backhoe, it is important to ensure that all sampling locations are clear of utility lines and poles (subsurface as well as above surface).

2. Using the backhoe, dig a trench to approximately 3 feet in width and approximately 1 foot below the cleared sampling location. Place removed or excavated soils on plastic sheets. Trenches greater than 5 feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

3. Use a shovel to remove a 1- to 2-inch layer of soil from the vertical face of the pit where sampling is to be done.

4. Take samples using a trowel, scoop, or coring device at the desired intervals. Be sure to scrape the vertical face at the point of sampling

to remove any soil that may have fallen from above, and to expose fresh soil for sampling. In many instances, samples can be collected directly from the backhoe bucket.

5. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

6. Abandon the pit or excavation according to applicable state regulations. Generally, shallow excavations can simply be backfilled with the removed soil material.

2.8 CALCULATIONS

This section is not applicable to this SOP.

2.9 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following QA procedures apply:

- All data must be documented on field data sheets or within site logbooks.

- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

2.10 DATA VALIDATION

This section is not applicable to this SOP.

2.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and specific health and safety procedures.

APPENDIX A

Figures

Figure 1: Sampling Augers

SOP #2012

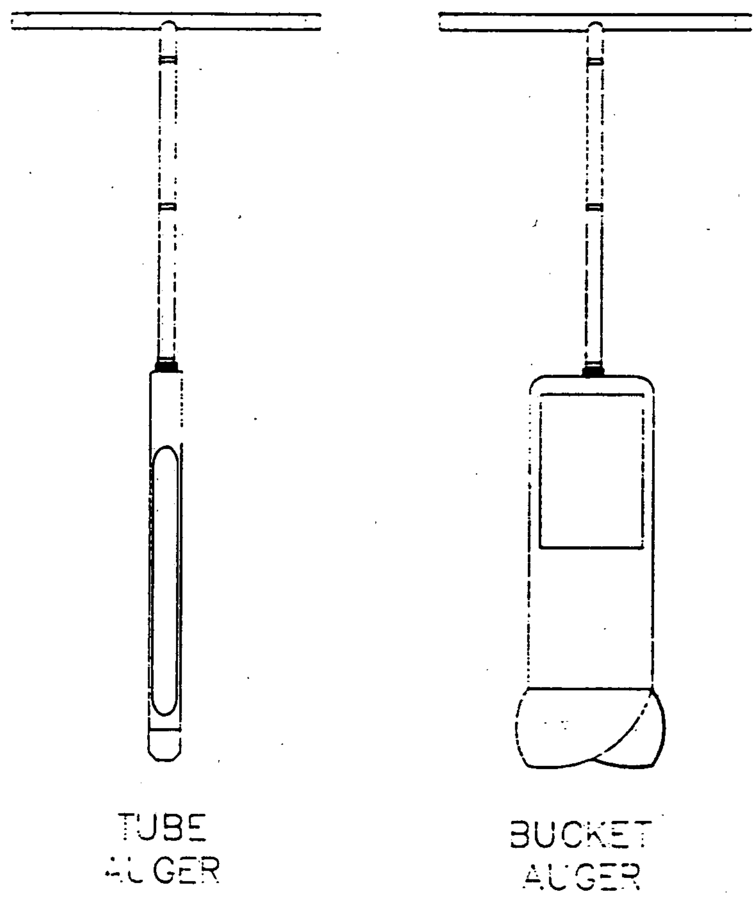
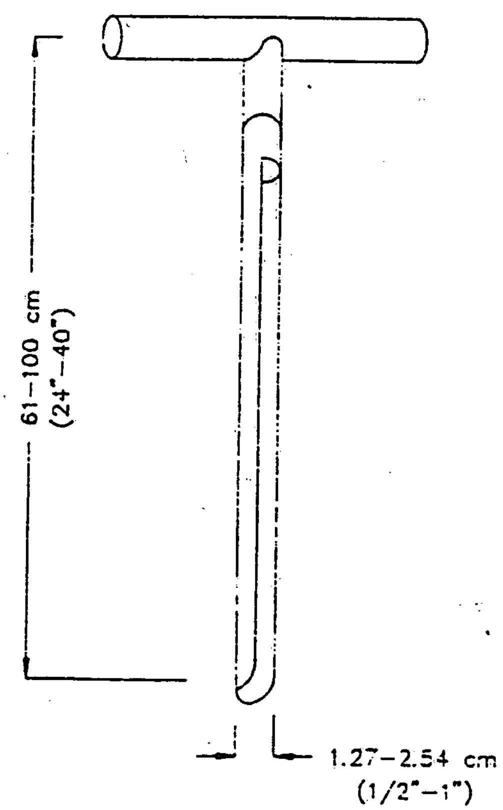


Figure 2: Sampling Trier

SOP #2012



CHAIN OF CUSTODY RECORD

RFP No.:
1469
PO No.:
58211

The Laboratory should send verbal and written results to the attention of Smita Sumbaly, START Analytical Coordinator

63780

Matrix Box No. 6:	Preservative Box No. 7
1. Surface Water	1. HCl
2. Ground Water	2. HN03
3. Leachate	3. Na2SO4
4. Rinsate	4. H2SO4
5. Soil/Sediment	5. Other (Specify)
6. Oil	6. Ice Only
7. Waste	N. Not Preserved
8. Other (Specify)	

Name of Unit and Address: WESTON MANAGERS DESIGNERS/CONSULTANTS

Suite 201
1090 King Georges Post Road, Edison, New Jersey 08837-3703
Phone: 908-225-6116 Fax: 908-225-7037

	Sample Number	Sample Collection MM/DD/YY/Time	Sample Matrix (Enter box 6 #)	Sample Conc. L/M/H	Sample Type C/G	Sample Preservat'n (Enter # from box 7)	RAS ANALYSIS VOA	BNA	PEST	PCBs	TAL	CN	RCRA ANALYSIS IGN	COR	REAC	TPH	OTHER
001	SS-1	8/26/96 /1030hrs	5	L	C	6	X	X	X	X	X	X					
002	MS-1	1030hrs	5	L	C	6	X	X	X	X	X	X					
003	MS-1/MSD	1030hrs	5	L	C	6	X	X	X	X	X	X					
004	SS-2	1100 hrs	5	L	C	6	X	X	X	X	X	X					
005	SS-3	1120hrs	5	L	C	6	X	X	X	X	X	X					
006	SS-4	1110 hrs	5	L	C	6	X	X	X	X	X	X					
007	SS-5	1125hrs	5	L	C	6	X	X	X	X	X	X					
008	SS-6	1055hrs	5	L	C	6	X	X	X	X	X	X					
009	Rinsate	1000hrs	4	L	G	2	X	X	X	X	X	X					2 is for TAL CN is preserved by NaOH VOA's are pre by HCL.

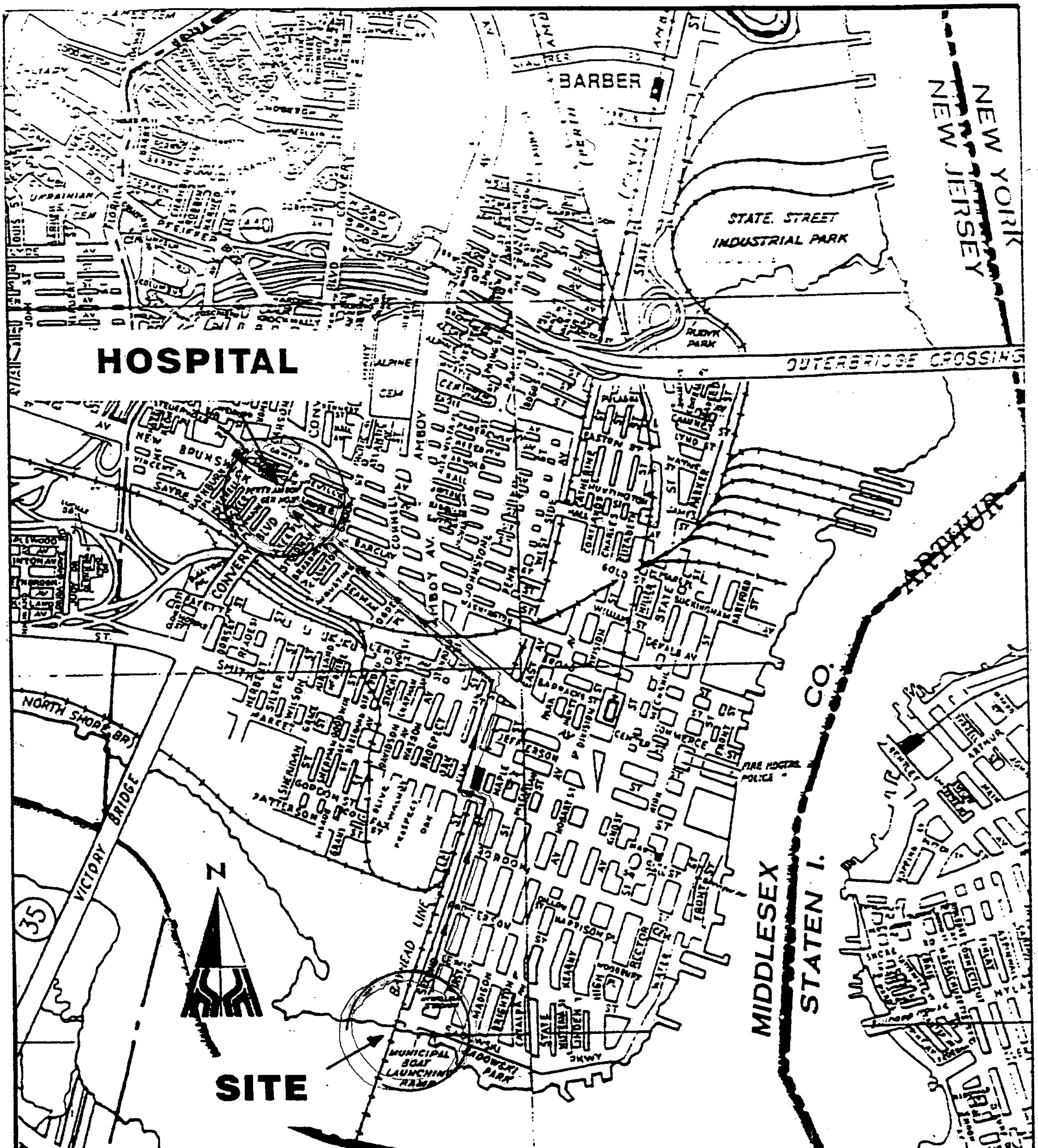
Person Assuming Responsibility for Sample:	Time	Date (MM/DD/YY)
J. Bhamidipati	1305	8/26/96

Sample Number	Relinquished By:	Time	Date (MM/DD/YY)	Received By:	Reason for Change of Custody
			1515 8/26/96	John P. Dallhemze	

Roy F. Weston, Inc.

FEDERAL PROGRAMS DIVISION

In Association with Resource Applications, Inc., R.E. Sarriera Associates, PRC Environmental Management, C.C. Johnson & Malhotra, P.C., and GRB Environmental Services, Inc.



Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH FOSTER WHEELER USA CORPORATION, C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC., R.E. SARRIERA ASSOCIATES, AND GRB ENVIRONMENTAL SERVICES, INC.

EPA OSC C. Agnihotri	Hospital Route
START PM S. Bhamidipati	Second Street

Detailed Cost Report: 08/09/96

Printed on: 08/12/96

TDD Number: 0296070008 Contract: 11098101002 PCS NUMBER: 1437

Site Name: SECOND ST. SITE Hours: 250 OSC: AGNIHOTRI

Site Number: EOOFP OT Approved: Y PM: BHAMIDIPATI

EMP#	NAME	REG HOURS	OT HOURS	TOTAL HOURS	
002868	KETHA	4.0	0.0	4.0	
006709	KELLEY	1.2	0.0	1.2	
009107	BHAMIDIPATI	26.5	0.0	26.5	
011846	FOERTER	2.0	0.0	2.0	
	WEEKLY TOTALS	33.7	0.0	33.7	1103.05
	LOE HOURS AND COSTS TO DATE		12.0	39.7	$ 1,279
	ODC COSTS TO DATE				$ 0
	TOTAL ESTIMATED COSTS TO DATE				$ 1,279

Kalpana Pandya

(908) 709-4900

Book Value

Retail

15,500

12,900

13,000

wholesale:

Bob

14,600

~~Auto~~

15000

18000

19500

wholesale

Interest

9

6.5

Apr

4 Door

19600

13000

5,800

DVDs

REGION II ANALYTICAL SERVICES REQUEST FORM

TO: Lisa Guarneiri, DPO

FROM: C.B. Agnihotri, OSC C.B. Agnihotri

DATE: August 12 1996

Site Name: Second Street
Site Location: PERTH Amboy, NJ
Site ID#: EP
Site TDD#: 02 9607-0006
PCS #: 1637

Date Of Request: August 12-1996
Sampling Date: August 19-1996
Proposed samples
Delivery to Lab:
Turnaround: Verbal: TWO WEEKS
Written: THREE WEEKS

# of Samples	Sample Type	Analysis Required	QA/QC Required	Unit Cost	Analysis Cost
6	Soil	TCL + TAL + CN	2		
1	Aqueous	TCL + TAL + CN	2		
1	Soil MS/MSD	TCL + TAL + CN			

Total: ___________

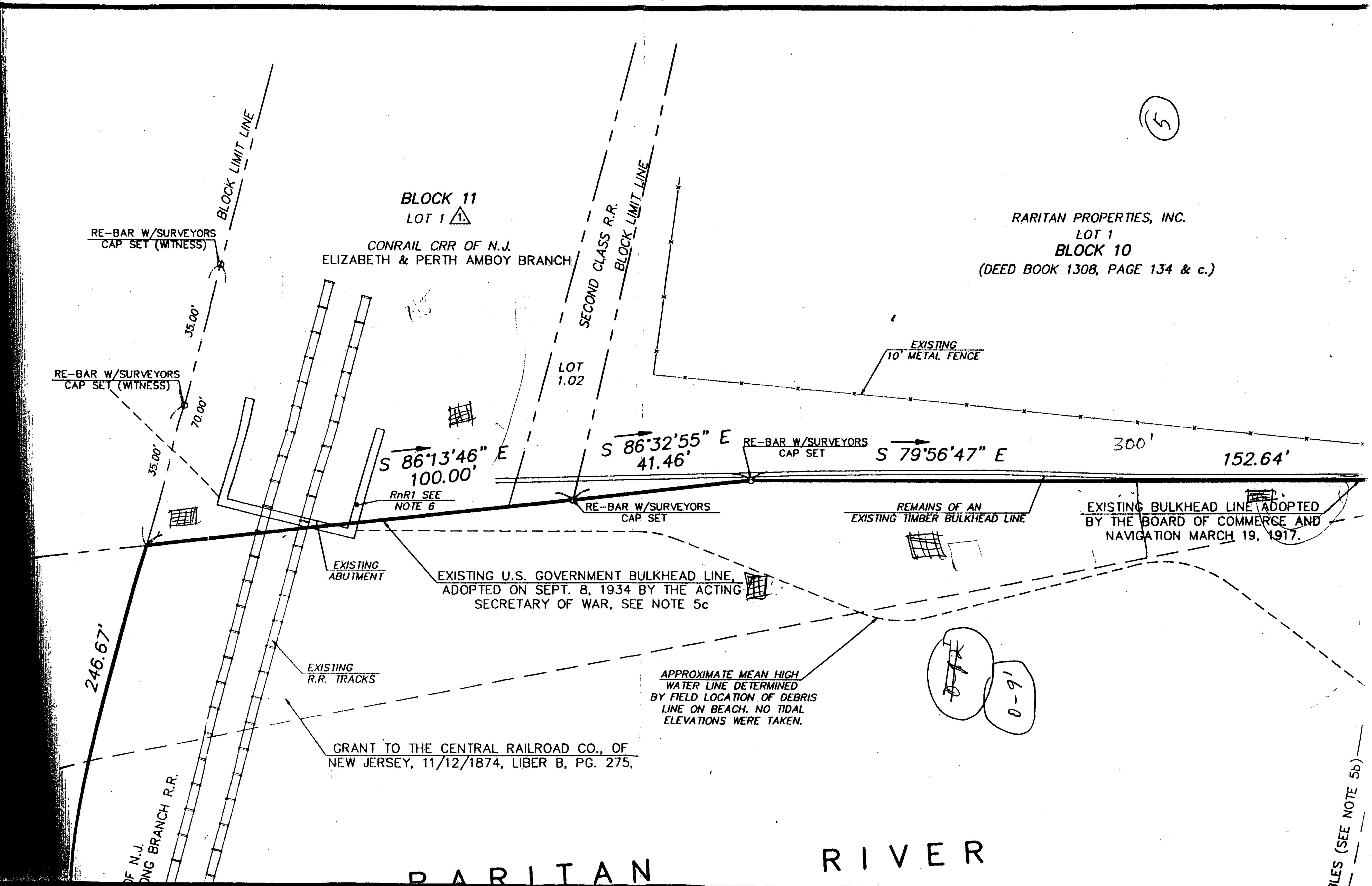
Total prior analytical services funding at this site ___________.

Name of Laboratory	Contact	Date of Request	Date Reply Requested	Date of Reply	Analysis Total Cost

Justification for quick-turn-around: ___________

Additional Comments: (justification for private analytical service)

START PM: SUBBARAO BHAMIDIPATI
START Analytical Coordinator: SMITHA SUMBALY
Analytical Services TDD#: ___________ PCS#: ___________


BLOCK LIMIT LINE
RE-BAR W/SURVEYORS CAP SET (WITNESS)
BLOCK 11
LOT 1
CONRAIL CRR OF N.J.
ELIZABETH & PERTH AMBOY BRANCH
SECOND CLASS R.R.
BLOCK LIMIT LINE
RARITAN PROPERTIES, INC.
LOT 1
BLOCK 10
(DEED BOOK 1308, PAGE 134 & c.)
35.00'
RE-BAR W/SURVEYORS CAP SET (WITNESS)
70.00'
35.00'
LOT 1.02
EXISTING 10' METAL FENCE
S 86°13'46" E
100.00'
S 86°32'55" E
41.46'
RE-BAR W/SURVEYORS CAP SET
S 79°56'47" E
300'
152.64'
RnR1 SEE NOTE 6
RE-BAR W/SURVEYORS CAP SET
REMAINS OF AN EXISTING TIMBER BULKHEAD LINE
EXISTING BULKHEAD LINE ADOPTED BY THE BOARD OF COMMERCE AND NAVIGATION MARCH 19, 1917.
EXISTING ABUTMENT
EXISTING U.S. GOVERNMENT BULKHEAD LINE, ADOPTED ON SEPT. 8, 1934 BY THE ACTING SECRETARY OF WAR, SEE NOTE 5c
246.67'
EXISTING R.R. TRACKS
APPROXIMATE MEAN HIGH WATER LINE DETERMINED BY FIELD LOCATION OF DEBRIS LINE ON BEACH. NO TIDAL ELEVATIONS WERE TAKEN.
GRANT TO THE CENTRAL RAILROAD CO., OF NEW JERSEY, 11/12/1874, LIBER B, PG. 275.
OF N.J.
NG BRANCH R.R.
RARITAN
RIVER
(SEE NOTE 5b)

N

REGION II ANALYTICAL SERVICES REQUEST FORM

TO: Lisa Guarneiri, DPO

FROM: CHAITANYA AGNIHOTRI, OSC

DATE: ______

Site Name: SECOND STREET
Site Location: PERTH AMBOY, N.J
Site ID#: FP
Site TDD#: 029607 - 0008
PCS #: 1437

Date Of Request: August 9, 1996
Sampling Date: August 19, 1996
Proposed samples
Delivery to Lab: ______
Turnaround: Verbal: TWO WEEKS
Written: THREE WEEKS

# of Samples	Sample Type	Analysis Required	QA/QC Required	Unit Cost	Analysis Cost
6	SOIL	TCL + TAL+CN	2		
1	AQUEOUS	TCL + TAL+CN	2		
1	Soil (MS/MSD)	TCL + TAL+CN			

Total: ______

Total prior analytical services funding at this site ______.

Name of Laboratory	Contact	Date of Request	Date Reply Requested	Date of Reply	Analysis Total Cost

Justification for quick-turn-around: ______

Additional Comments: (justification for private analytical service)

______

START PM: SUBBARAO BHAMIDIPATI
START Analytical Coordinator: SMITHA SUMBALY
Analytical Services TDD#: ______ PCS#: ______